

RoHS Compliant 1x9 SC Duplex Optical Transceiver For Gigabit Ethernet and Fiber Channel



Features

- Industry Standard 1x9 Footprint and duplex SC Connector interface
- Compliant with Specifications for IEEE 802.3z/Gigabit Ethernet
- OPT-1250Bxxxxx compliant with the 1.0625GBd Fiber Channel 100-SM-LC-L FC-PI Rev.13
- OPT-1250Axxxxx compliant with the 1.0625GBd Fiber Channel FC-PI 100-M5-SN-I Rev.13
- Single +3.3V Power Supply
- PECL or TTL Receiver Signal Detect Indicator
- Wave Solderable and Aqueous Washable
- Laser Class 1 Product which comply with the requirements of IEC 60825-1 and IEC 60825-2
- RoHS Compliance

Description

The OPT-1250xxxxx from DELTA are 1x9 transceiver modules designed expressly for high-speed communication applications that require rates of up to 1.25Gbit/sec. They are compliant with the Gigabit Ethernet standards as well as 1x Fiber Channel standards.

The OPT-1250xxxxx transceivers are provided with the SC receptacle that is compatible with the industry standard SC connector.

The OPT-1250xxxxx transceivers are Class 1 eye safety products. The optical power levels, under normal operation, are at eye safe level.

Application

- Gigabit Ethernet/Fast Ethernet
- Switched backplane applications

Performance

- OPT-1250AxFxx data link up to 500m in 50/125µm Multi-Mode Fiber (or 220m in 62.5/125µm Multi-Mode Fiber).
- OPT-1250BxQxx data link up to 10km in 9/125µm Single Mode Fiber (or 550m in 50/125µm or 62.5/125µm Multi-Mode Fiber).

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T_S	-40		85	°C	
Lead Soldering Temperature	T_{SOLD}			260	°C	
Lead Soldering Time	t_{SOLD}			10	sec.	
Supply Voltage	V_{CC}	0		5	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Ambient Operating Temperature	T_A	0		70	°C	
Supply Voltage	V_{CC}	3.135		3.465	V	

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Total Supply Current	I_{CC}			310	mA	
Transmitter						
Transmitter Data Input Voltage-Low	$V_{IL} - V_{CC}$	-1.81		-1.48	V	DC Couple
Transmitter Data Input Voltage-High	$V_{IH} - V_{CC}$	-1.16		-0.88	V	
Transmitter Differential Input Voltage	V_{DT}	0.5		2.4	V	AC Couple
Receiver						
Data Output Voltage-Low	$V_{OL} - V_{CC}$	-1.95		-1.62	V	DC Couple
Data Output Voltage-High	$V_{OH} - V_{CC}$	-1.045		-0.74	V	
Receiver Differential Output Voltage	V_{DR}	0.35		2	V	AC Couple
SD Output Voltage-Low	$V_{SDL} - V_{CC}$	-1.95		-1.62	V	LVPECL
SD Output Voltage-High	$V_{SDH} - V_{CC}$	-1.045		-0.74	V	
SD Output Voltage-Low	V_{SDL}	0		0.8	V	LVTTL
SD Output Voltage-High	V_{SDH}	2		V_{CC}	V	

Optical Characteristics

(Data Rate=1250Mbps, PRBS=2⁷-1, NRZ, 62.5/125μm MMF for OPT-1250AxFxx;

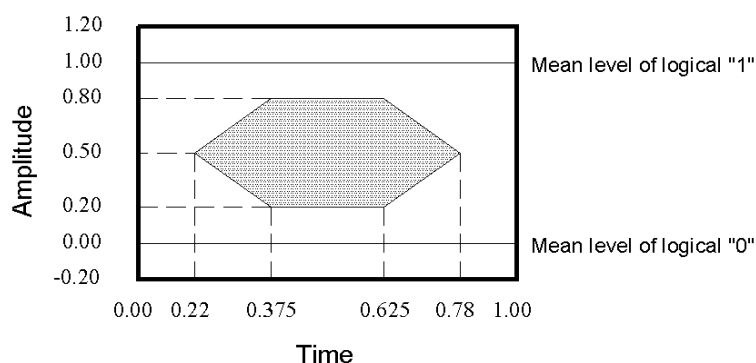
Data Rate = 1250Mbps, PRBS=2⁷-1, NRZ, 9/125μm SMF for OPT-1250BxQxx)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Transmitter						
Output Optical Power	P_0	-9.5		-4	dBm	OPT-1250AxFxx
		-9.5		-3		OPT-1250BxQxx
Optical Extinction Ratio	ER	9			dB	
Center Wavelength	λ_c	830	850	860	nm	OPT-1250AxFxx
		1270	1310	1355		OPT-1250BxQxx
Spectral Width (RMS)	σ			0.85	nm	OPT-1250AxFxx
				4.5		OPT-1250BxQxx
Optical Rise/Fall time	t_r/t_f			0.26	ns	OPT-1250AxFxx Note1
				0.4		OPT-1250BxQxx Note1
Relative Intensity Noise	RIN			-117	dB/Hz	OPT-1250AxFxx

				-120		OPT-1250BxQxx
Output Eye	Complies with the IEEE 802.3z/D2 specification, and is class 1 laser eye safety					
Receiver						
Sensitivity	P _{IN}			-17 -19	dBm	OPT-1250AxFxx Note2 OPT-1250BxQxx Note2
Input Optical Wavelength	λ		850 1310		nm	OPT-1250AxFxx OPT-1250BxQxx
Data Output Rise/Fall Time	t _r /t _f			0.36 0.5	ns	OPT-1250AxFxx Note1 OPT-1250BxQxx Note1
Signal Detect-Asserted	P _A			-17 -19	dBm	OPT-1250AxFxx OPT-1250BxQxx
Signal Detect-De-asserted	P _D	-35			dBm	
Signal Detect-Hysteresis	P _A - P _D	0.5			dB	
Receiver Saturation Power	P _{SAT}	-4 -3			dBm	OPT-1250AxFxx OPT-1250BxQxx

Notes:

- These are unfiltered 20%~80% values
- The sensitivity is provided at a BER of 1×10^{-10} or better with an input signal consisting of 1250Mb/s, 2^7-1 PRBS and ER=9dB.

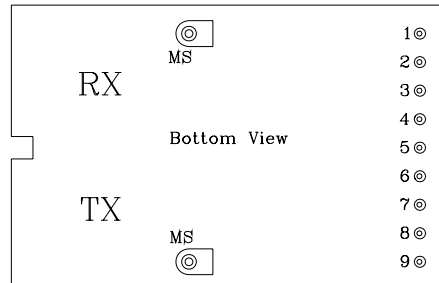


Mask of the eye diagram for the optical transmit signal

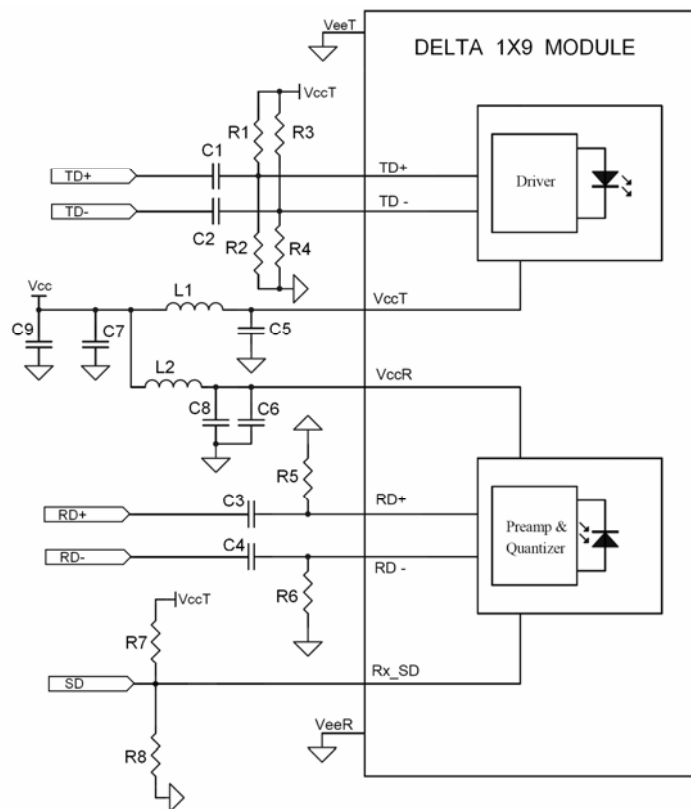
Pin Definition

Pin No.	Pin Name	Description
1	GND	Receiver Signal Ground
2	RD(+)	Receiver Data Out Non-inverted (LVPECL)
3	RD(-)	Receiver Data Out Inverted (LVPECL)
4	SD	Receiver Signal Detect (LVPECL or TTL)
5	VccR	Receiver Power Supply
6	VccT	Transmitter Power Supply
7	TD(-)	Transmitter Data In Inverted (LVPECL)
8	TD(+)	Transmitter Data In Non-inverted (LVPECL)
9	GND	Transmitter Signal Ground

Pin Out Drawing

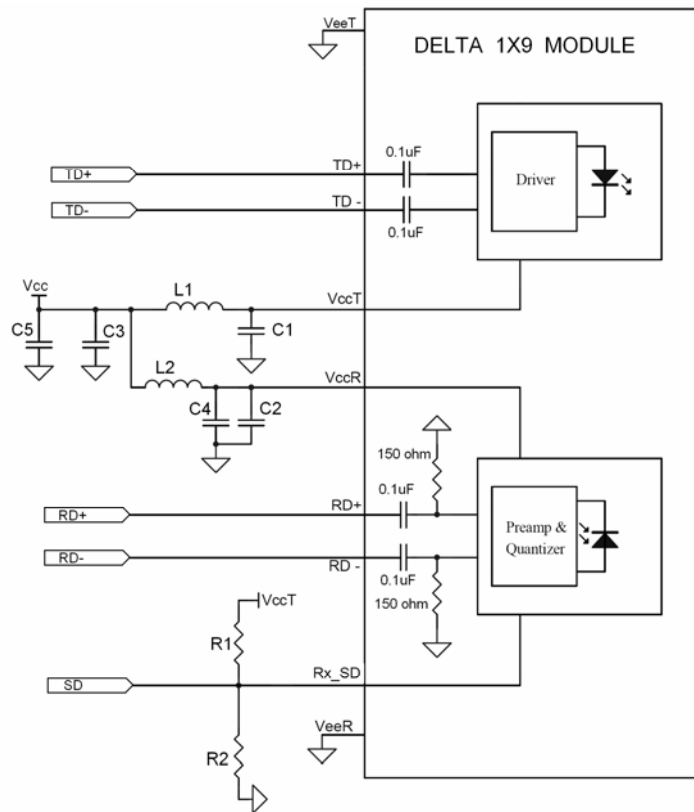


Recommend Circuit Schematic for Internal DC Coupled Transceivers



R1=R3=82 ohm (3.3V)
 R2=R4=130 ohm (3.3V)
 R5=R6=150 ohm (3.3V)
 R7=130 ohm (3.3V PECL),NC (TTL)
 R8=82 ohm (3.3V PECL),NC (TTL)
 C1=C2=C3=C4=C5=C6=C7=100 nF
 C8=C9=10uF
 L1=L2=1uH

Recommend Circuit Schematic for Internal AC Coupled Transceivers



R1=130 ohm (3.3V PECL),NC (TTL)

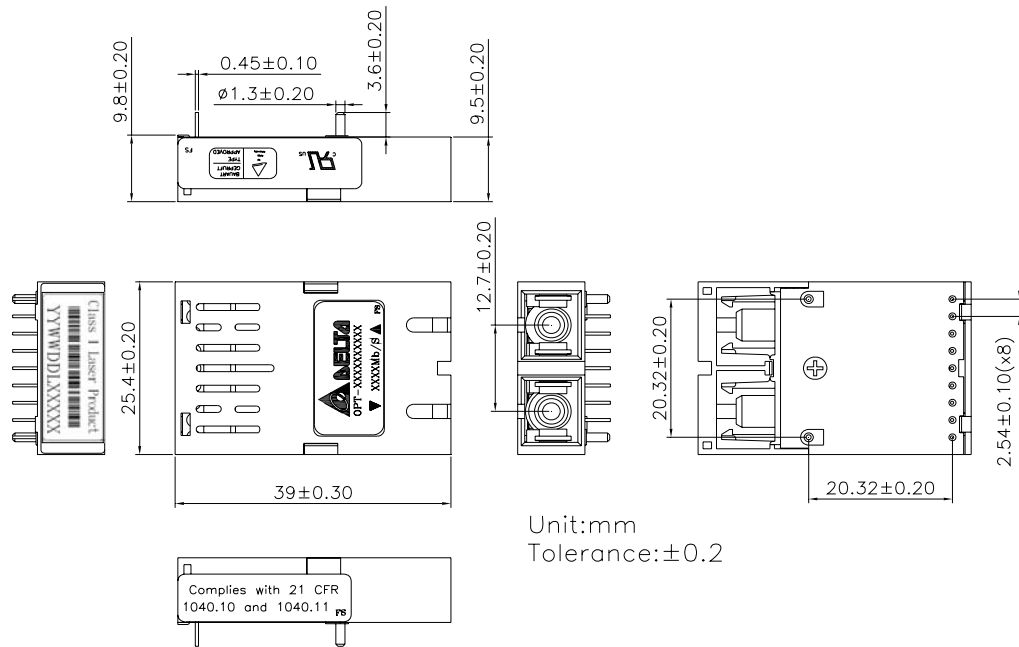
R2=82 ohm (3.3V PECL),NC (TTL)

C1=C2=C3= 100 nF

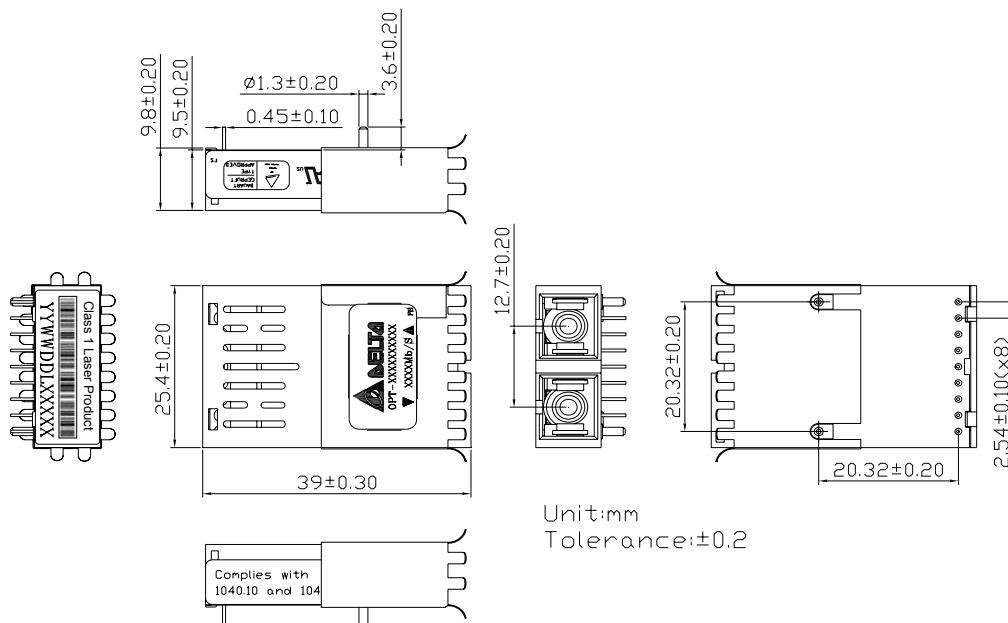
C4=C5=10uF

L1=L2=1uH

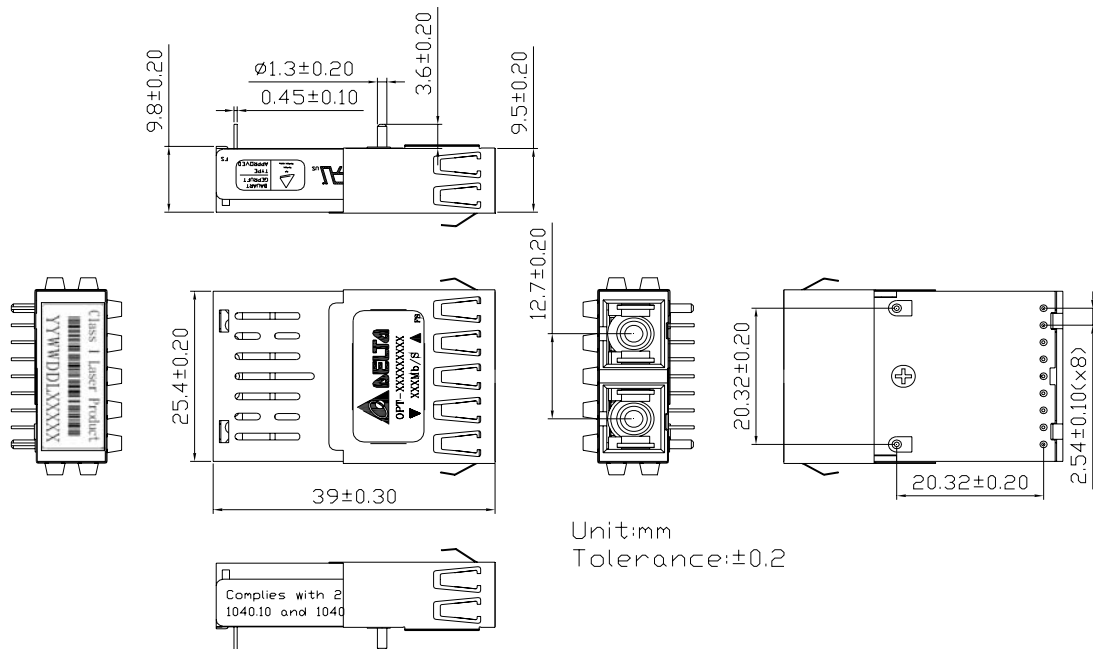
Package Outline Drawing (without shielding)



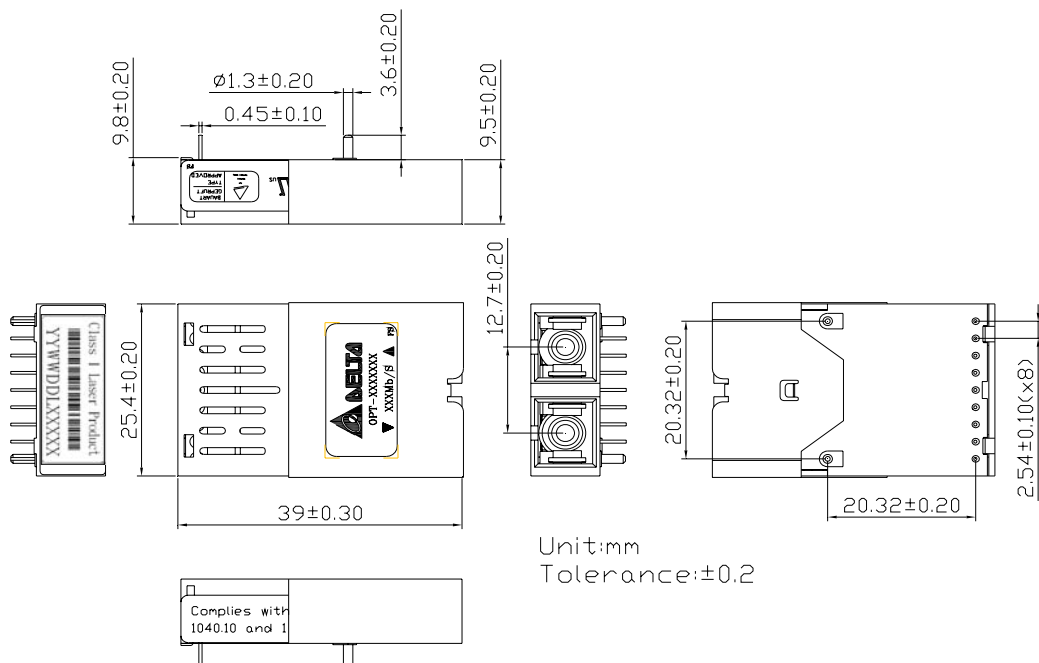
Package Outline Drawing (A type shielding)



Package Outline Drawing (B type shielding)



Package Outline Drawing (C type shielding)



Regulatory Compliance

Feature	Reference	Performance
Electromagnetic Interference (EMI)	FCC Class B EN 55022 Class B (CISPR 22A)	(1) Satisfied with electrical characteristics of product spec. (2) No physical damage
Radio Frequency Electromagnetic Field	EN 61000-4-3 IEC 1000-4-3	
Electrostatic Discharge to the Duplex Receptacle	EN 61000-4-2 IEC 1000-4-2 IEC 801.2	
Electrostatic Discharge to the Electrical Pins	MIL-STD-883E Method 3015.7	
Eye Safety	US FDA CDRH AEL Class 1 EN 60950: 2000 EN 60825-1: 1994+A11+A2 EN 60825-2: 2000	CDRH File # 0321539-00 TUV Certificate No. R50032471
Component Recognition	Underwriters Laboratories and Canadian Standards Association Joint Component Recognition for Information Technology Equipment Including Electrical Business Equipment	UL File # E239394

Order Information

OPT- 1250X₁X₂X₃X₄X₅X₆X₇

X₁ Light Source Types

- A: Multi-mode 850nm
B: Single-mode 1310nm

X₂ Power Supply Voltage and SD Level

- 2: 3.3V, PECL SD Level
4: 3.3V, TTL SD Level

X₃ Distance

- F: 500m, 50/125μm MMF
Q: 10km, 9/125μm SMF

X₄ Package Type & Coupling Type

- 1: 1x9 SC DC/DC
2: 1x9 SC AC/AC

X₅ RoHS

- R: RoHS Compliant

X₆ Shielding Type & Revision Code

- A: New design
B: B type shielding
C: C type shielding
D: A type shielding

X₇ Temperature

- Blank: 0 to +70 degree C

Appendix A. Document Revision

Version No.	Date	Description
0G	2006-09	Release
0H	2008-01	Correct "Total Supply Current", "TTL SD Output", "PECL SD Output", Recommend Circuit Schematic, Optical Rise/Fall time, Spectral Width (RMS), Pin Definition, Package Outline, Order Information.
0I	2009-02	Remove Transmitter item of "OPT-1250BxIx" in Single-Mode Transceiver; Update label change.

0J	2009-04	Revise Document Style; Cut off Extended and Industrial Temperature PNs, OPT-1250x1xxx PNs, Non-RoHS PNs; Revise PECL SD Level description; Unify Multi-Mode and Single Mode Optical Characteristic specification; Revise Parameter symbols; Modify P_D to -35dBm; Revise Pin Out Drawing.
----	---------	---